Capodanno Senza Danno: The Effects of an Intervention Program on Fireworks Injuries in Naples

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ABSTRACT

To study the effects of a comprehensive, multifaceted intervention program to reduce fireworks-related injuries during the Italian New Year's holiday season, active surveillance was conducted in the 18 public emergency rooms of Naples, Italy, before and after implementation of the program. Preintervention data collected between December 24, 1992, and January 6, 1993, were compared with data collected during the same period in 1993–1994. The number of injuries decreased by 48%, from 353 to 183, with the greatest declines seen among 10- to 12-year-olds. The broad-based intervention implemented during the 1993–1994 holiday season appears to have substantially reduced the number of injuries. (*Am J Public Health.* 1996;86:84–86)

Introduction

Italy has a long tradition of using fireworks to welcome in the new year. Although laws exist limiting the sale and use of fireworks, these laws are not uniformly enforced, and each year since 1988, more than 1000 injuries and between one and eight deaths have been reported.

Metropolitan Naples, which includes the city of Naples and extends south along the slopes of Mount Vesuvius, is located in southern Italy and has a population of 3 million. This area has always experienced high rates of fireworks injury. During December 1992, the Regional Epidemiologic Observatory of Campania initiated active surveillance of fireworks injury in 18 emergency rooms in the metropolitan area; the goal was to describe the injured in terms of time, place, and person as well as the site, type, and circumstances of the injury and the type of fireworks involved.[1] The information collected showed that rates were highest in densely populated parts of the city, were considerably higher among males, and were highest among 10- to 14-year-olds. Additionally, the study demonstrated that there were two temporal peaks of injury, one between midnight and 3 AM involving predominantly adults, and the other in the middle of the following day involving primarily children and young adolescents. Illegal fireworks, particularly a type of large cherry bomb, were found to be responsible for 60% of the total injuries and 100% of the most severe injuries. The most common maneuvers associated with injuries in children included relighting unexploded fireworks or lighting the powder gathered from other fireworks. It was concluded that a series of simple measures, including enforcing the laws prohibiting the sale of illegal fireworks, cleaning the streets early in the morning of January 1, and informing children and the public about the risks of firework-related injuries, could contribute greatly to a reduction in the number of injuries experienced.

As a result of the study, an intervention program was developed: *Capodanno Senza Danno* (New Year's without Harm). During the course of the year, the program gained the support of the police, the local administration, the press, and the school system. During the 1993–1994 holiday season, the police sequestered more than 12.5 million fireworks, 82% more than during the corresponding period in the previous year.

As in previous years, the press gave considerable coverage to the risks associated with the use of fireworks. However, in December 1993, local newspapers were contacted and more specific information from the 1992–1993 study was published, including the type and seriousness of the injuries seen, the maneuvers associated with the greatest risk of injury, and the type of fireworks and behaviors to avoid. The local government also spread the message via the media, "Your hand serves to give us a hand; don't put it at risk with illegal fireworks."

In addition to the above activities, the street cleaners were ordered to clean the streets early on the morning of January 1 to avoid problems encountered in previous years with the relighting of unexploded fireworks and powder. Finally, the school superintendent circulated a memorandum to teachers responsible for health education suggesting that they inform students about the dangers and correct use of fireworks.

As a result of these efforts, an overall decline in injuries as well as in the proportion of severe injuries was anticipated. To determine whether such changes had occurred, the surveillance system from the 1992–1993 holiday season was reactivated during the following year's

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holiday season, and data were collected using the same methods and the same sites included in the earlier system. In this paper, we present the results of the control efforts.

Methods

Six trained study assistants used a data collection form developed for the 1992–1993 holiday season to abstract data in a standardized fashion from emergency room records and from records of intentional and nonintentional injuries maintained by the police posts located on the grounds of each hospital. The same 18 emergency rooms in the province of Naples that participated in 1992–1993 as well as the Civil Hospital of Aversa were included in the surveillance system. These sites represent all public acute care facilities in the area. For all fireworks injuries occurring between December 24, 1993, and January 6, 1994, information collected included date and hour of arrival, age, sex, commune of residence, expected duration of recovery, and the location and type of lesion. A case person was defined as a resident of the Naples region seen in one of the study emergency rooms between the dates stipulated above with a fireworks-related injury. Denominator data for rate calculations were obtained from national census data.[2]

Data were entered and analyzed with Epi-Info 5.[3] Poisson and chi-square tests were used to evaluate whether chance could have explained the decrease in number and type of injuries observed between the two holiday seasons.

Results

The number of persons injured by fireworks during the 1993–1994 season was 183, 48% lower than the 353 reported during the same period in 1992–1993 ($P < 10^{-9}$). Overall rates declined from 10.0/100 000 in 1992–1993 to 6.1/100 000 the following year.

The greatest reduction in cases occurred on New Year's Day, while similar numbers of case persons were seen on New Year's Eve and in the days before and after the New Year holiday. In 1993–1994, 141 case persons were seen on New Year's Day, 58% lower than the number seen on the same day the previous year ($P < 10^{-9}$).

As was seen during the 1992–1993 season, two peaks were observed on New Year's Day during the 1993–1994 season (data not shown). The first occurred between midnight and 3 AM and the second between noon and 3 PM. However, the number of case persons in each of the two peaks was less than half that seen during the previous year.

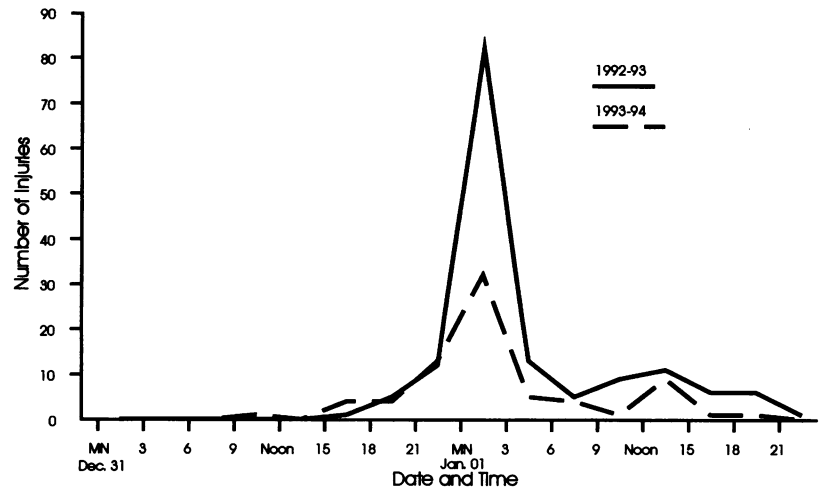

FIGURE 1—Fireworks injuries among persons older than 14 years, by time of occurrence, Naples, 1992–1993 and 1993–1994.

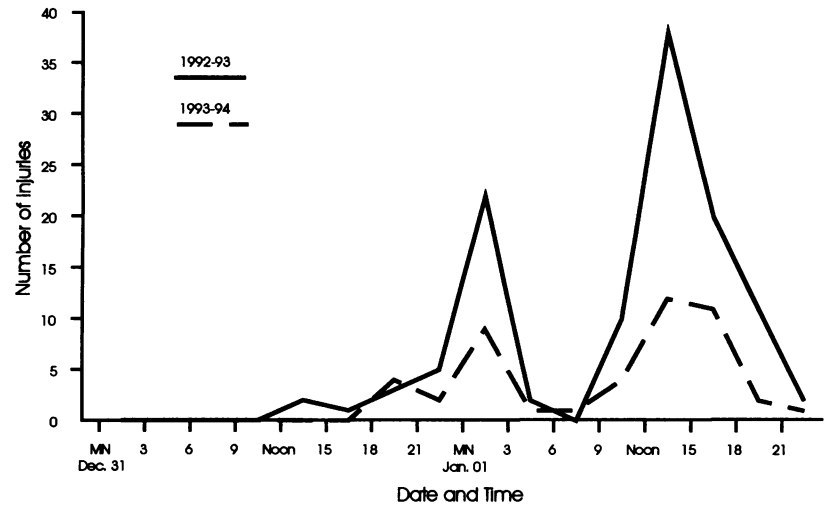

FIGURE 2—Fireworks injuries among persons aged 14 years and younger, by time of occurrence, Naples, 1992–1993 and 1993–1994.

During the 1992–1993 season, the peak incidence for adults occurred between midnight and 3 AM (Figure 1), while for persons up to 14 years of age, the peak incidence was between noon to 3 PM on New Year's Day (Figure 2). The same pattern was repeated in 1993–1994, although the peaks were considerably attenuated.

Children under age 14 accounted for 48% of the 1993–1994 cases, compared with 43% in the previous year. However, age-specific case rates declined for all age groups during the 1993–1994 season, the most dramatic change occurring in the 10- to 12-year-old age group, among whom the rate dropped 51%, from 45.9/100 000 residents to 22.3/100 000. The male: female ratio also changed in 1993–1994, rising to 15:1 from an earlier 9:1.

The number of injured persons requiring hospitalization dropped 43% in 1993–1994, from 102 to 58, although the

rate of hospitalization among those who were injured remained constant. The number of case patients for whom recovery was expected to take more than 20 days decreased 29%, from 70 to 50, and the number of case patients for whom full recovery was not expected declined 48%, from 23 to 12.

Forty-three percent of those injured in 1993–1994 had more than one site of injury, compared with 50% of those injured in 1992–1993. The most frequent sites of involvement were the hands (44.7%), the face (21.8%), and the eyes (12.2%). The location of injury did not differ substantially between the two holiday seasons. Children were more likely to have facial injuries than adults in both 1992–1993 ($\chi^2 = 4.2$; $P = .04$) and 1993–1994 ($\chi^2 = 11.0$; $P = .009$).

During the 1993–1994 holiday season, the most common injuries were burns (41.8%) and lacerations (31.1%). The frequency of the former remained identical to that observed the previous year while the frequency of the latter dropped from 39%. A total of 71 severe injuries (third-degree burns, avulsion of the hands, complete or partial amputation involving the hands, and ocular lesions) occurred in 1993–1994, representing a decline of 32% from the 104 severe injuries seen in the previous year.

Discussion

The number of persons seeking treatment for fireworks injuries during the period from Christmas to Epiphany (January 6) in Naples halved between 1992–1993 and 1993–1994 after the institution of an intervention program. Although the epidemiologic profile of injuries remained similar with respect to time and person, the number of persons injured in each category diminished substantially. A gratifying decrease was seen in children 10 to 12 years of age, the group demonstrated in 1992–1993 to be at greatest risk for injury.

The number of severe injuries requiring hospitalization declined, paralleling the overall decrease in number of injuries. The number of persons with debilitating injuries such as partial or complete amputations also declined; however, the decline was not as substantial as for overall injuries and severe injuries.

It is tempting to assume that the dramatic decrease in injuries between 1992–1993 and 1993–1994 was the result of the public health measures instituted. Indeed, more than 12 million pieces of illegal fireworks were confiscated from the black market vendors, 2½ times as many as during the 1992–1993 holiday season, although no data were available on the type of fireworks confiscated. In addition, an active campaign was carried out in the press, the issue was raised in the schools, and the streets were cleaned early on New Year's Day. However, other factors may have been involved, including the depressed economic situation of the area, which may have decreased the number of fireworks purchased, and a major rainstorm that took place on New Year's Day, which may have impeded the collection of unexploded fireworks by children. The finding that the decrease was similar for severe and less severe injuries suggests that such other factors may have played a role, although this decrease could also have been explained if confiscation of fireworks was not selective.

The rate of fireworks injuries observed during 1993–1994 was lower than that reported in Seattle in 1983,[4] but it was nonetheless considerably higher than that reported by the National Electronic Injury Surveillance System for Independence Day injuries in the United States for the period of 1980 to 1989.[5] Despite differences in rates, which are at least partly owing to differences in the surveillance methodologies used, the sociodemographic characteristics of the victims of fireworks injuries are remarkably similar to those of the Seattle and National Electronic Injury Surveillance System,[4,5] as well as to those reported from the Philippines,[6] with the highest rates observed in males and among those 10 to 14 years of age. Similarly, hands appear to be consistently the most frequent site of injury. Of note, however, is that the type of injury varies from country to country, with lacerations and amputations more common in Italy and burns more common in the United States.[4,5] This would appear to be a function of the type of fireworks involved, with more injuries in Italy caused by explosive devices[1] than those observed in the United States.[5]

To our knowledge, little has been published on the effects of a comprehensive intervention program on the occurrence of fireworks injuries. In the Philippines, the lack of effectiveness of both draconian laws banning the sale of fireworks and educational campaigns without clear messages was amply demonstrated.[6] Also demonstrated, however, was the effectiveness of a more focal program begun in 1992 that emphasized an extensive media campaign with a limited number of messages. As was the case with the Naples program, this effort resulted in a substantial decrease in injuries.[7] □

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